What is claimed is:

    1.   An inspection system for inspecting samples, comprising:

        a polar coordinate stage having a chuck and a track, wherein the chuck and

the track are coupled such that the chuck can be moved to different positions

along the track, and wherein the chuck can be rotated about a center of rotation;

        an optical imaging system, having a field of view, which receives a probe

beam reflected off a sample positioned on the chuck; and

        a processor system which controls the position of the chuck relative to the

track, and uses first information derived from positioning a site on a sample in the

field of view to determine an offset from the field of view to the center of rotation

of the polar coordinate stage, wherein the first information is used to determine a

location of a site on a sample being inspected.

    2.   The inspection system of claim 1, wherein the first information is

determined by positioning a first site in the field of view, and then rotating the chuck 180

degrees, and moving the chuck a distance equal to twice a first distance where the first

distance corresponds to a distance between the chuck at the first position and a home

position, and then positioning the first site in the field of view.

    3.   The inspection system of claim 2 further comprising:

        an operator control coupled to the processor such that an operator can

control the position of the chuck; and

wherein after the first site has been positioned in the field of view, and the

chuck has been rotated 180 degrees and been moved a distance equal to twice the

first distance, the operator uses the operator controls to position the first site in the

field of view, and the processor system stores information which corresponds to

5   an amount of rotation and an amount of movement necessary to position the first

site in the field of view.

4.   The inspection system of claim 2, wherein the processor is programmed

such that after the first site is positioned in the field of view, the processor causes the

10   chuck to rotate 180 degrees, and to move a distance equal to twice the first distance.

5.   The inspection system of claim 4 further comprising:

an operator control coupled to the processor such that an operator can

control the position of the chuck; and

15   wherein after the first site has been positioned in the field of view, and the

chuck has been rotated 180 degrees and been moved a distance equal to twice the

first distance, the operator uses the operator controls to position the first site in the

field of view, and the processor system stores information which corresponds to

the amount of rotation and movement necessary to position the first site in the

20   field of view.

6.   The inspection system of claim 1, wherein the first information is

determined by positioning the chuck in a first position having a first site positioned in the

field of view, where the first site is positioned in the field of view by rotating the chuck a

first number of degrees, and moving the chuck a first distance from a home position, and

then positioning the chuck in a second position by rotating the chuck 180 degrees, and

moving stage a distance equal to twice the first distance, then rotating the chuck a second

5   number of degrees $\Delta\Theta$ and moving the chuck a second distance ΔR to position the first

site in the field of view, wherein the processor determines the position of the center of

rotation in the home position, in terms of x and y coordinates when the chuck is in the

second position, where these coordinates are referred to as x(site) and y(site); and where

the processor is programmed to determine the first information using the following

10   equations:

$y(lens) = \Delta R/2$, and

$x(lens) = \tan(\Delta\Theta/2) \cdot [(x(site)^2 + y(site)^2)^{1/2} - \Delta R/2].$

15

7.   In an inspection system having a processor system and a polar coordinate

stage which includes a chuck for supporting a sample, a method for determining an offset

between a center of rotation of a polar coordinate stage and a field of view of an imaging

20   system, the method comprising:

moving the chuck to a first position which is a first distance from a home

position, such that a first site is positioned in the field of view;

rotating the chuck 180 degrees and moving the chuck twice the first

distance, such that the chuck is in a second position;

25   adjusting the position of the chuck such that the chuck is in a third position

where the first site is positioned in the field of view;

TWI-14710

using a $\Delta\Theta$ degrees of rotation associated with adjusting the position of

the chuck from the second position to the third position, and a distance ΔR

associated with adjusting the position of the chuck from the second position to the

third position, to determine the offset between the center of rotation of the polar

coordinate stage when it is in the home position and the field of view, and;

using the offset to control the movement of the chuck to position a

particular location on a wafer in the field of view.

8.   The method of claim 7 further comprising:

programming the processor system to move the chuck from the first

position to the second position.

9.   The method of claim 8 further comprising:

transmitting operator inputs to the processor system, and in response the

processor system causes the chuck to move from the second position to the third

position.

10.   The method of claim 7 further comprising:

determining an x coordinate, x(site), for a home position center of rotation

in terms relative to the position of the chuck when it is in the second position; and

determining a y coordinate, y(site), for the home position center of

rotation in terms relative to the position of the chuck when it is in the second

position.

TWI-14710

11.   The method of claim 10 further comprising:

causing the processor to determine the offset from the field of view to the

center of the rotation using the following equations,

$y(lens) = \Delta R/2$, and

5

$x(lens) = \tan(\Delta\Theta/2)\cdot[(x(site)^2 + y(site)^2)^{1/2} - \Delta R/2]$,

where y(lens) and x(lens) correspond to the position of the field of view relative

to the center of rotation when the chuck is in the home position.

10   12.   In an inspection system having an imaging system with a field of view,

and a stage which includes a chuck for supporting a sample, a method for determining an

offset between a center of rotation of the stage and the field of view, the method

comprising:

positioning the chuck in a first position based on a first site being

15   positioned in the field of view;

positioning the chuck in a second position such that the fist site is

positioned in the field of view;

determining the difference between the first position and the second

position; and

20   using the difference between the first position and the second position to

calculate the offset between the center of rotation of the stage and the field of

view.

13.   The method of claim 12 further comprising using the offset to control the

positioning of the chuck.

14.   The method of claim 12 further comprising determining the difference

5   between the first position and the second position and in terms of an angle of rotation,

ΔΘ, and a distance of movement ΔR.

15.   The method of claim 14 further comprising:

determining x and y coordinates, x(site) and y(site), for a center of rotation

10   in a home position relative to the chuck when it is in the first position.

16.   The method of claim 14 further comprising:

determining a y dimension of the offset between the field of view and the

center of rotation using the equation,

15     $y(lens) = \Delta R/2$.

17.   The method of claim 15 further comprising:

determining a x dimension of the offset between the field of view and the

center of rotation using the equation,

20     $x(lens) = \tan(\Delta\Theta/2) \cdot [(x(site)^2 + y(site)^2)^{1/2} - \Delta R/2]$.

18. The method of claim 15 further comprising:

determining a x dimension of the offset between the field of view and the

center of rotation using the equation,

$$x(lens) = \tan(\Delta\Theta/2)\cdot[(x(site)^2 + y(site)^2)^{1/2} - \Delta R/2]; \text{ and}$$

5   determining a y dimension of the offset between the field of view and the

center of rotation using the equation,

$$y(lens) = \Delta R/2.$$

19. An inspection system for inspecting samples, comprising:

10   a stage having a chuck coupled to a track, such that the chuck can be

moved to different positions along the track, and rotated about a center of rotation

an optical imaging system having a field of view; and

a processor system which controls the position of the chuck relative to the

track, and uses first information corresponding to an offset between the field of

15   view and the center of rotation to determine a location of a site on a wafer being

inspected.

20. In an inspection system having a stage with a center of rotation, and an

imaging system with a field of view, a method for determining a location of a site on a

20   wafer being inspected, the method comprising:

establishing a stage home position;

using a processor to control the position of the stage; and

using an offset between the center of rotation and the field of view to determine the location of a site being inspected by the inspection system relative to the stage home position.

5   21.   In an inspection system having a processor system and a stage which includes a chuck for supporting sample, a method for determining an offset between a center of rotation of a the stage and an imaging system having a field of view the method comprising:

moving a chuck of the stage to a first position which is a first distance

10   from a home position, such that a first site on a sample is positioned in a field of view;

moving the chuck to a second position where the first site is positioned in the field of view; and

using the difference between the second position and a third position

15   where the chuck is rotated 180 degrees from the first position and moved twice the first distance from the first position, to determine the offset.